REMARKS

The foregoing amendments are responsive to the October 19, 2007 Office Action. Applicant respectfully request reconsideration of the present application in view of the foregoing amendments and the following remarks.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Response to Rejection of Claim 1 Under Nonstatutory Obvious-Type Double Patenting

Claim 1 has been canceled.

Response to Rejection of Claim 1 Under 35 U.S.C. 102

Claim 1 has been canceled.

Response to Rejection of Claims 1, 21, and 30-32 Under 35 U.S.C. 112

The Examiner has rejected independent Claims 1 and 21 and Claims 30-32 depending on Claim 21 under USC 112. Regarding Claim 1 and Claim 21, Examiner has stated:

> "However, without undue experimentation, it is unclear for one skilled in the art how to perform 'reducing a rank' when each of said composite sources comprising a linear combination of one of said original basis functions."

Claim 1 has been cancelled and Claim 21 has been amended to clarify the use of composite sources comprising a linear combination of more than one original basis function.

Response to Rejection of Claims 2-8, 15-16, and 25 Under 35 U.S.C. 112 First Paragraph

The Examiner has rejected independent Claim 2 and Claims 3-8, 15-1, and 25 depending on Claim 2 under USC 112. The Examiner stated:

> "Independent claim 2 has been amended to recite 'a plurality of alpha sub-blocks' and 'a plurality of beta sub-blocks' in lines 12 and 14 of the claim, which does not appear to have support in the original disclosure. Applicant is required to provide support for this amendment."

The first statement in Claim 2 describes "a plurality of alpha sub-blocks" in the "decomposition of said interaction matrix corresponding to a plurality of said first sub-blocks" where "said first sub-blocks containing non-zero elements." The second statement regarding "a

plurality of beta sub-blocks" requires that there is a plurality of sub-blocks containing zero elements in the "decomposition of said interaction matrix". The support for this occurs at least in part in Figures 5 and 13, and in the Specification.

Page 36 lines 9-15 of the specification state:

> "This result is due to a block structure of the matrix, such as the example matrix shown in Figure 5. Some notation will be useful in describing this. When Equation (1) is described by its block structure the result is:

$$\begin{bmatrix} T_{1,1} & T_{1,2} & \dots & T_{1,m} \\ T_{2,1} & T_{2,2} & \dots & T_{2,m} \\ \dots & \dots & \dots & \dots \\ T_{m,1} & T_{m,2} & \dots & T_{m,m} \end{bmatrix} \bullet \begin{bmatrix} Y_1 \\ Y_2 \\ \dots \\ Y_m \end{bmatrix} = \begin{bmatrix} V_1 \\ V_2 \\ \dots \\ V_m \end{bmatrix} \qquad (2)$$

> Here, $T_{2,m}$ does not represent one number within the matrix T. Rather, this particular block represents a sub-matrix within T,..."

Page 36 lines 17-19 of the specification state:

> "However, here the elements in the matrix in Equation (2) are themselves matrices of numbers. These matrices are blocks from the matrix T."

Page 37 lines 1-2 of the specification state:

> "This has a block structure, which for this embodiment is:

$$\begin{bmatrix} I & 0 & \dots & 0 \\ A_{2,1} & I & \dots & 0 \\ \dots & \dots & \dots & \dots \\ A_{m,1} & A_{m,2} & \dots & I \end{bmatrix} \bullet \begin{bmatrix} B_{1,1} & B_{1,2} & \dots & B_{1,m} \\ 0 & B_{2,2} & \dots & B_{2,m} \\ \dots & \dots & \dots & \dots \\ 0 & 0 & \dots & B_{m,m} \end{bmatrix} = \begin{bmatrix} T_{1,1} & T_{1,2} & \dots & T_{1,m} \\ T_{2,1} & T_{2,2} & \dots & T_{2,m} \\ \dots & \dots & \dots & \dots \\ T_{m,1} & T_{m,2} & \dots & T_{m,m} \end{bmatrix}$$

(4)

Page 38 lines 1-3 of the specification states:

> "Figure 13 shows an idealized view of the sparse storage within blocks of A and B. In particular, a block of B, $B_{i,j}$, is generally sparse when i is not equal to j."

Thus, the specification describes multiple blocks (the $B_{i,j}$ in Equation (4) for i not equal to j). These B's have the structure shown in the second row of Figure 13. Figure 13 shows that each block B has a sub-block containing non zero elements (shown as dark and, in this embodiment,

corresponding to an alpha sub-blocks) and a sub-block containing zero elements (shown as white and, in this embodiment, corresponding to a beta sub-block).

Response to Rejection of Claims 9-14, 17-20, 22, 26-30, and 33-36 Under 35 U.S.C. 112 Second Paragraph

The Examiner has rejected independent Claim 9 and Claims 10-14, 17-20, and 26-29 depending on Claim 9 under USC 112. The Examiner stated it is unclear what "said processor means" in line 13 of the claim is referring to. Applicant has amended the claim to clarify.

The Examiner has rejected independent Claim 22 and dependant Claims 33-36 stating there is insufficient antecedent basis for "said interaction data" in lines 13 and 24-25 of Claim 22.

Applicant has amended claim 22 by replacing the first instance of "said interaction data" by "interaction data".

The Examiner has rejected Claim 30 stating there is insufficient antecedent basis for "said first matrix" in the claim. Applicant has amended the claim to recite "said matrix containing transmitted disturbances to yield a second set of basis functions"

The Examiner has rejected Claims 33-36 stating there is insufficient antecedent basis for "The Device" in these claims. These claims have been amended to recite "The computing system".

Response to Rejection of Claims 1 Under 35 U.S.C. 101

Claim 1 has been canceled.

Response to Rejection of Claims 2-39 Under 35 U.S.C. 101

In the Office Action of October 19, 2007 the Examiner rejected Claims 1-39 under 35 U.S.C. 101 because the invention disclosed in the claims is directed to non-statutory subject matter. The Examiner stated,

> (I) "Claims 1-39 are directed to the manipulation of abstract ideas of data compression or factorization of an interaction matrix by applying a decomposition. This claimed subject matter lacks a practical application of a judicial exception (law of nature, abstract idea, naturally occurring

> article/phenomena) since it fails to produce a useful, concrete, and tangible result."

In support of this rejection, the Examiner quoted from two sections of the MPEP. First, the Examiner quoted from MPEP 2106 IV C 2 (2) a), which has the heading "USEFUL RESULT":

> (II) "Likewise, a claim that can be read so broadly as to include statutory and non statutory subject matter must be amended to limit the claim to a practical application. In other words, if the specification discloses a practical application of a section 101 judicial exception, but the claim is broader than the disclosure such that it does not require a practical application, then the claim must be rejected."

Second, the Examiner quoted from MPEP 2106 IV C 2 (2) b) which has the heading "TANGIBLE RESULT":

> (III) "The tangible requirement does not necessarily mean that a claim must be either tied to a particular machine or apparatus or must operate to change articles or materials to a different state or thing. However, the tangible requirement does require that the claim must recite more than a 35 U.S.C. 101 judicial exception, in that the process claim must set forth a practical application of that judicial exception to produce a real-world result. Benson, 409 U.S. at 71-72, 175 USPQ at 676-77 (invention ineligible because had "no substantial practical application.")."

Examiner's first statement quoted above, (I), argues that the claimed subject matter lacks a practical application of a judicial exception. Applicant asserts that this statement is contrary to MPEP 2106.01(I) which states:

> "In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035."

Applicant has amended the claims to clarify their use on a computer. This satisfies the requirement for a useful, concrete and tangible result. Applicant respectfully asserts that no further justification on this issue is required. Nevertheless, Applicant responds below to Examiner's reasoning regarding the "useful result" and "tangible result" issues.

Examiner's statement (II) described above provides a quote from MPEP on the issue of the requirement of a "useful result." Specifically, Examiner quotes a discussion pertaining to a disclosed invention that provides a useful result, while the claimed invention is not limited to a useful result. Applicant asserts that all of the present claims are limited to an invention with a

practical result. The implementation of the invention on a computer provides a practical result (as MPEP 2106.01 (I) acknowledges).

Furthermore, the various claims recite additional useful results. Some of these results are regarding compression. Other useful results are regarding computing a physical effect. For example, Claim 2 recites "describing physical effects due to electric charges." Other claims recite "an energy source" and "physical disturbances". In summary regarding Examiner's statement (II), Applicant respectfully asserts that the claimed invention has numerous practical results as described above.

Examiner's statement (III) described above provides a quote from MPEP on the issue of the requirement of a "tangible result." The beginning of this quote states, "The tangible requirement does not necessarily mean that a claim must be either tied to a particular machine or apparatus or ..." Thus, this quote and MPEP 2106.01 acknowledges that computer implemented methods satisfy the "tangible result" requirement. Furthermore, the physical quantities recited in several claims are additional tangible results.

Further guidance on what constitutes a "useful, concrete and tangible result" is given in MPEP 2106 IV D, which states, "For a further discussion of case law defining the line between eligible and ineligible subject matter, as well as..., see Annex II and Annex III of the *Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility*, 1300 Off. Gaz. Pat. Office 142 (Nov. 22, 2005) (Patent Subject Matter Eligibility Interim Guidelines)." In particular, Annex II, Section B (ii) of those guidelines is titled "Useful, Concrete, and Tangible Result." The first paragraph of that section provides two examples of patentable subject mater:

> "For example, the court in State Street noted that the claimed invention in Alappat 'constituted a practical application of an abstract idea (a mathematical algorithm, formula or calculation), because it produced "a useful concrete and tangible result"--smooth waveform.' Id. Similarly, the claimed invention in Arrythmia 'constituted a practical application of an abstract idea (a mathematical algorithm, formula or calculation), because it corresponded to a useful, concrete and tangible thing—the condition of a patient's heart.' Id."

Applicant asserts that the compression of the present application is analogous to the smooth waveform of Alappat since both result in an efficient method. Applicant further asserts that computations regarding a physical effect (whether an electric field, a pressure, or otherwise)

are analogous to computing the condition of a patient's heart. Thus, Applicant asserts that, according to the MPEP, either of these alone provides a useful, concrete and tangible result.

The Examiner raises the issue of Preemption on Page 5 of the Office Action of October 19, 2007, stating:

> (IV) "Furthermore, as described in the specification in lines 19-20 of page 8, 'The terms "sources" and "physical sources" are uses herein to include all types of actual and/or fictitious sources.'"
>
> (V) Accordingly, even reciting 'describing the physical effects due to electric charges' in claim 2 and 'each original source corresponding to an energy source' in claim 21, claims 1-39 are not for a particular practical application of the idea of compression of interaction data or applying a decomposition to a matrix embodied therein but seeking to patent substantially every application of the idea of compression of interaction data or applying decomposition to a matrix, which is an attempt to patent the idea itself and is not permitted."

Regarding Examiner's comment (IV) above, Applicant understands this comment to suggest that the use of fictitious sources to compute an electric field or another physical quantity means that one is not really computing an electric field or other physical quantity. Applicant respectfully asserts that this interpretation is not supported by the disclosure of the present patent application, since the use of a method involving a judicial exception to compute a physical quantity does not necessarily imply that one did not compute a physical quantity. For example, in leading up to the statement in the specification that the Examiner quoted in (IV) above, the specification states (Page 8, lines 4-11):

> "Sometimes it is convenient to consider disturbances as being created by an equivalent source (e.g. a fictitious source) rather than a real physical source. For example, in most regions of space (a volume of matter for example) there are a large number of positive electric charges and a large number of negative electric charges. These positive and negative charges nearly exactly cancel each other out. It is customary to perform calculations using a fictitious charge, which is the net difference between the positive and negative charge, averaged over the region of space. This fictitious charge cannot be identified with any specific positive or negative particle."

The specification also mentions using a magnetic current rather than an electric current in a calculation, and states (Page 6, lines 5-7):

> "Nevertheless, it is known how to mathematically relate electric currents to equivalent magnetic currents to produce the same electromagnetic waves."

Applicant points out that, for example, Claim 2 recites "an interaction matrix describing physical effects due to electric charges." Applicant respectfully asserts that the referenced statement regarding fictitious sources does not make the term electric charges here so broad as to include all physical and non physical effects.

The requirement of non-preemption, when it applies, does not limit a claimed invention to only one particular application. According to MPEP 2106 IV C 3, "One may not patent a process that comprises every 'substantial practical application' of an abstract idea, ..." Thus, it is sufficient to find one "substantial practical application" of the judicial exception part of the invention that is not within the claimed invention. As an example, the application of the judicial exception part of Claim 2 to computations not involving electric charges but involving economic data is a substantial practical application that shows the judicial exception is not preempted.

In statement (V) the Examiner describes the judicial exemption as "the idea of compression of interaction data or applying a decomposition to a matrix embodied therein." The various claims have a number of features not within this judicial exception identified by the Examiner. Some of these features regard how the computation (the judicial exception) is performed on a computer in an efficient way (this is not within the judicial exception).

Claims 2-8, 15, 16 and 25 recite the transformation of a description of interactions due to electric charges into a description of certain multiple interactions involving electric charges. Furthermore, they recite a method that provides a decomposition having zero values. This results in a structural relationship among the method used, how the computation is performed and how it is stored on a computing system.

Claim 25, which is dependant on Claim 2, further recites "to find electric charges due to a disturbance."

Claims 9-14, 17-20 and 26-29 recite a device in which there is a structural relationship in the functioning of a processor storage, and this structural relationship results in efficiencies of operation.

Claims 21 and 30-32 recite a method for producing a practical result, i.e. the strengths of energy sources.

Claim 31 recites a method for producing a practical result, i.e. information about electric currents excited (at least in part) by an electromagnetic field.

Claim 32 recites a method for producing a practical result, i.e. information about pressure disturbances excited (at least in part) by a pressure field.

Claims 22 and 33-35 describe several practical results. They describe a computing system with a structural relationship between a processing means and a storage means. They also describe a computing system that produces the strengths of physical disturbances. Furthermore, they describe compression which results in further efficiencies.

Claims 33, 34, and 35 which are dependant on Claim 22, each describe a specific practical result, of producing the strength of a pressure field, a particle flux, and an electric current respectively.

Claims 23-24 and 37-39 shows the practical result of using a computer to find the multiple interactions in a decomposition of interaction data. Furthermore, there is compression for some of the decomposition. This results in efficiencies and in a structural relationship between processing and storage.

Claims 37, 38, and 39 which are dependant on Claim 24, each describe a specific practical result, of producing the strength of a pressure field, an energy source, and an electric current respectively.

The Examiner has identified the judicial exception as "the idea of compression of interaction data or applying a decomposition to a matrix embodied therein." Applicant asserts that it is sufficient to find one substantial application of each claim that is not preempted by the judicial exception, and that he has done so for each claim. Applicant asserts that Claims 2-39 are directed to statutory subject matter and allowable over the prior art. Accordingly, Applicant respectfully requests allowance of Claims 2-39.

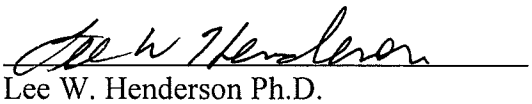
Summary

Applicant respectfully assert that Claims 2-39 are allowable over the prior art, and Applicant request allowance of Claims 2-39. If there are any remaining issues that can be resolved by a telephone conference, the Examiner is invited to call the undersigned attorney at (949) 721-6305 or at the number listed below.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

Dated: February 19, 2008

By: 

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